

EXHIBIT 7

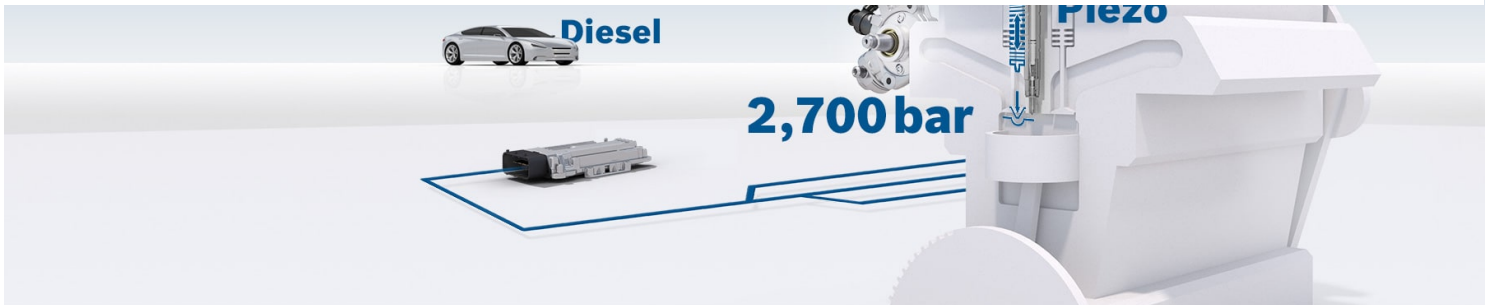
**BOSCH**

Invented for life

Bosch Mobility Solutions



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#drive system #diesel #fuel injection #exhaust-gas treatment

Common-rail system with piezo injectors

Diesel injection system CRS3-27 for a maximum pressure up to 2,700 bar

no other combustion engine is as versatile as the diesel engine. Its versatility can be attributed primarily to a high degree of efficiency and associated cost effectiveness. The requirements for diesel engine injection systems are constantly increasing: higher pressures, faster switching times and the flexible adaptation of the injection pattern to suit operating conditions make the diesel engine both economical and powerful. Bosch consistently further develops diesel drive systems, including components for fuel injection (diesel common-rail system) and fuel supply as well as the engine and air control, turbocharging, exhaust-gas treatment, glow system, brake system and engine lubrication.

comfortable acceleration

even at low speeds

quieter combustion

with up to ten individual injections per injection cycle

efficient power delivery

within a wide speed range

up to

100 kW/l

for very high specific engine outputs



Info package for download

Download all important system information here.

Manufacturers > **Drivers** > **Journalists** >

For powertrain systems and electrified mobility



Bosch brings new energy to drives – the same applies for the consistent further development of diesel drive systems.

The diesel engine is a very efficient powertrain. A further reduction in fuel consumption and CO₂ emissions may be possible and is consequently pushed by Bosch. CRS3-27 offers the option to be

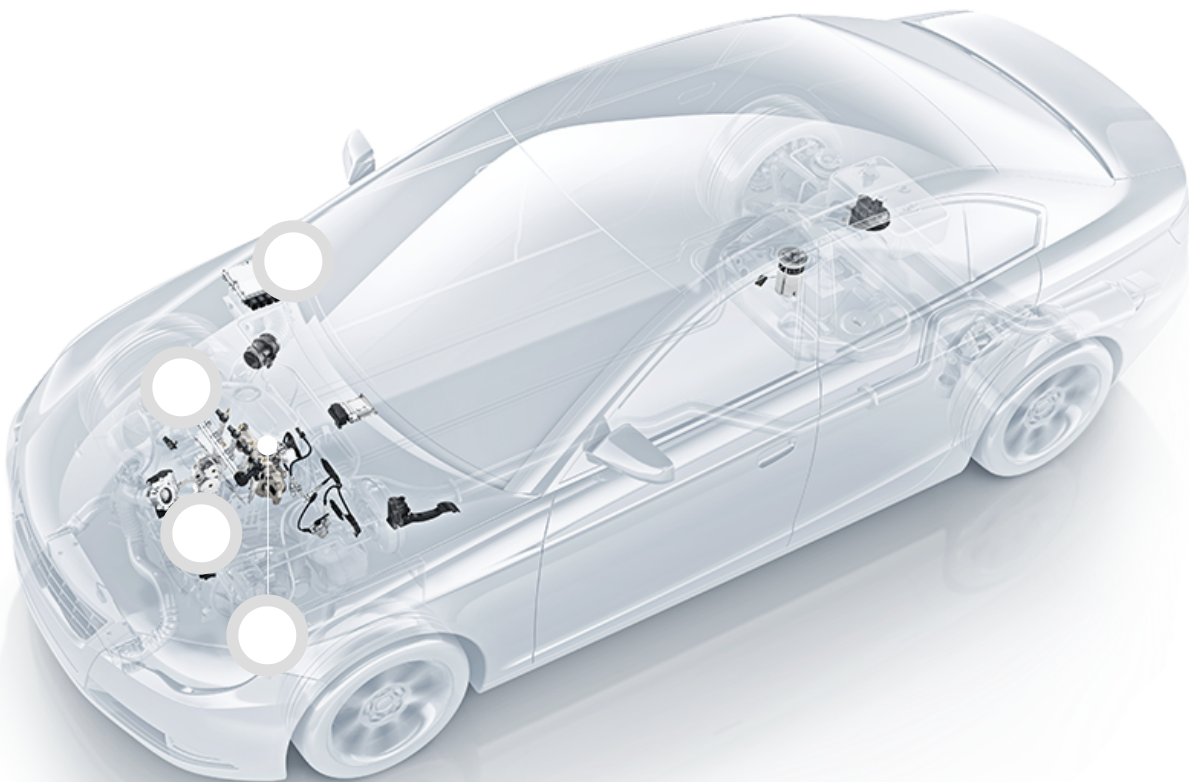
combined with hybrid technology for electrification.

All topics >

Common-rail injection system CRS 3-27

System overview

Product overview



CRS3-27 – powerful, economical and designed for the future

Diesel drive systems with common-rail injection systems combined with efficient exhaust-gas treatment can form the basis for economical vehicles. The primary advantage of the diesel common-rail system is the enormous flexibility of the injection pressure and the injection timing, which is achieved by separating the pressure generation and injection systems.

The fuel is permanently maintained at a high pressure ready for injection. The pressure is generated by the high-pressure pump. The fuel rail mounted on the engine serves as a high-pressure accumulator. From here, the fuel is distributed to the individual injectors. An injector with injection nozzle is integrated into each engine cylinder. The injection timing and fuel quantity are calculated and controlled individually for each cylinder.

The common-rail system with piezo injectors by Bosch enables the flexible injection of fuel at pressures up to 2,700 bar.

Even greater economy and precision

The “Digital Rate Shaping” strategy (DRS) contributes to a very small delay between pre-injection and main injection. DRS can be used for realizing a smoother combustion process with less interruptions that can further reduce noise, emissions and fuel consumption. The innovative “Needle Closing Control” (NCC) function can significantly increase injection accuracy over lifetime, in particular. Characteristic injector variables are measured from a sensor and exchanged with the electronic control unit.

Efficient exhaust-gas treatment with Denoxtronic

The Denoxtronic reducing agent dosing system can be used in combination with the electronic engine control unit to adjust the volume of reducing agent to the engine parameters. Precision sensors for diesel particle filters can help optimize the function of the filter.



Pre-heat systems

Diesel engines can start even faster and quieter with Bosch pre-heat systems. In combination with an optimized injection strategy, pre-heat systems can improve the performance of cold engines and reduce emissions. They can also assist heating of the particle filter during regeneration.

Fuel supply

The electronic engine control can enable the delivery of the required quantity of fuel from the tank to the high-pressure pump at a pressure of 5 to 6 bar in line with requirements.

Air control

In order to contribute to an efficient combustion while conserving resources, the amount of injected fuel must always be adapted accurately to the air mass that enters the cylinder. The air mass is measured accurately by a hot film air-mass sensor.

Electrification and downsizing

Together with the variable injection start and the option of multiple pre- and post-injections as well as short intervals between injections, the system is optimally designed for downsizing concepts with turbocharging as well as for combining with hybrid technology to electrify the powertrain.

Advantages of the diesel drive system with CRS3-27

Manufacturers

Drivers

SYSTEM BENEFITS FOR MANUFACTURERS

- ▶ For very high specific engine outputs up to 100 kw/l
- ▶ Supports compliance with Euro 6, Real Driving Emissions and comparable standards
- ▶ Efficient and versatile for passenger cars and light duty vehicles due to modular design
- ▶ A permanently available injection pressure that is independent of the speed and load allows the flexible selection of the injection start, quantity and duration
- ▶ High flexibility of multiple injections
- ▶ Simple mounting of the common-rail system on the engine

Service center temporarily unavailable



We ask for your understanding

Due to the current situation, our contact form is temporarily not available



Trade fairs calendar 2020

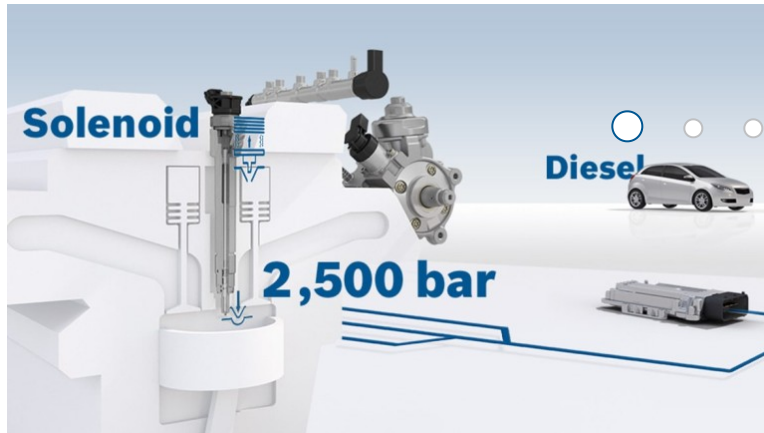
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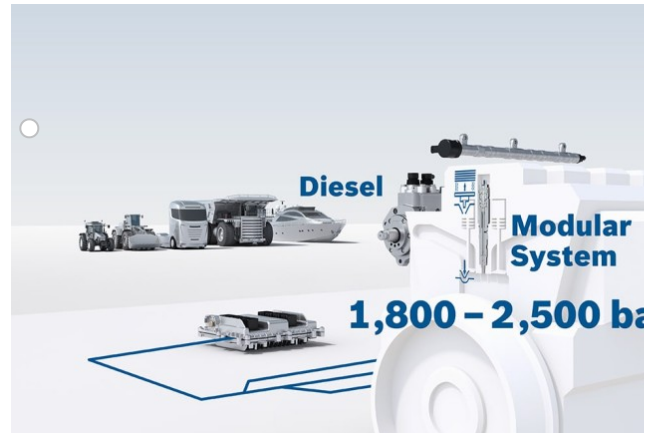
Further interesting topics



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Common-rail system with solenoid injectors

The primary advantage of the diesel common-rail system is the enormous flexibility of the injection pressure and the injection timing.



Read more >

Modular common-rail system for commercial vehicles (CRSN)

The modular common-rail system CRSN ensure efficient fuel supply and fuel injection in diesel engines.

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